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ABSTRACT

This booklet is intended to serve as a directory of source materials in the field of operations research, rather than as a bibliography per se. As such, it is a survey of the major bibliographic tools, indexing services, and general information sources that are relevant to the field. Most entries have been annotated briefly to indicate the value of the work for operations research. Citations are organized into separate sections for indexes and abstracts, bibliographies, dictionaries, directories, primary sources, introductions and guides, and handbooks. Within each section, entries are listed alphabetically by title, and there is also a cumulative title index of all works cited in the booklet. (Author/JG)

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OPERATIONS RESEARCH: An Elementary Guide to the Literature

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OPERATIONS RESEARCH: AN ELEMENTARY GUIDE TO THE LITERATURE

by

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The purpose of this work is to serve as a directory of source materials in the field of operations research. It is intended to be a guide to the literature of OR (operations research,) not a bibliography per se. Nor is this guide to be considered exhaustive in its survey since such a compendium is usually beyond the needs of most students, librarians and OR specialists. This then is a survey of the major bibliographic tools, indexing services and general information sources which are of importance to the field of operations research.

Most entries in the guide have been annotated. The goal of these brief descriptions is to familiarize the inquirer as to the value of a specific work to OR, since the majority of the citations at first glance would not appear to have much utility. Descriptions of the physical format of the publications such as specific indexes, frequency of cumulation, etc. generally has been omitted in this guide since these characteristics are more than amply explained in the works themselves.

What follows below is a capsulized view intending to answer the most basic of questions concerning OR, that is, what is operations research?

Management Science, Operational Research, Operations Research, or simply OR are four of the most frequently used names to describe the branch of science which investigates and devises solutions to management problems through the application of the scientific method. The history of this field, like that of human knowledge in general, has its roots in antiquity. But if we consider OR as being conceived in previous centuries, its birth certainly occurred during World War II in Great Britain and the United States. Original applications were in war strategy and optimum use of vital resources. Post-war reconstruction of Europe gave a new horizon to OR, this phase being the beginning of non-military development and utilization of OR. Civilian application in the U.S. did not occur until the 1950's when the tempo of commercial activity made a virtual necessity of OR.

Operations research is founded on the assumption that within economic activity there exists a high degree of order. OR seeks to define this order, to quantify, and to understand complete operating systems so as to maximize their effectiveness. Some of the basic characteristics of OR are the following:

I TOTAL SYSTEMS APPROACH

II USE OF INTER-DISCIPLANARY RESEARCH TEAMS

III USE OF THE SCIENTIFIC METHOD, I.E. OBSERVE, HYPOTHESIZE, TEST, CONTROL

While most early business and military applications of OR were in scheduling quarterly plans, inventory control, etc., now all facets of decision making problems may be analyzed by an OR

team. Today one finds OR involved in the construction of mathematical, economic, and statistical descriptions of models of decision and control problems. Evaluation of the consequences of decision choices and devising appropriate measures of effectiveness are yet other basic applications of OR.

Before proceeding, a note concerning the arrangement of citations. The guide is arranged into seven catagories:

1- INDEXES AND ABSTRACTS

2- BIBLIOGRAPHIES

3- DICTIONARIES

4- DIRECTORIES

5- PRIMARY SOURCES

6- INTRODUCTIONS AND GUIDES

7- HANDBOOKS

The entry in each section is alphabetically arranged by title of the work with each title being given a unique number which will be the basis of locating a title when using the index which is located at the end of the guide.

INDEXES AND ABSTRACTS

Abstracts may be expected to provide both the full bibliographic data necessary for retrieval of specific documents and a summary of the content of listed works. The purpose of the abstract is to allow the inquirer to rapidly survey a vast amount of material in a capsulized fashion in order to narrow his search to a specific body of information.

Objectiveness and universality of coverage are goals which many abstracting services attempt to attain within specific subject fields. The abstracts tend to be arranged along subject lines which vary in specificity. Usually the abstracts are indexed for author and title access. These indexes almost universally will be found to cumulate.

Indexes are basically the same as the abstracts save the fact that they omit the descriptions of the articles. One must therefore rely on the alphabetical subject arrangement which appears in the majority of the indexes and what clues the titles of the citations may give for an idea of the content of the specific work. Most indexes and abstracts publish lists of the journals which they survey.

005 Applied Mechanics Review. Easton, Pennsylvania: American Society of Mechanical Engineers, V. 1-, 1948-.

This monthly review medium seeks to cover world literature in applied mechanics and related engineering science. It is selective, not universal in literature surveyed. OR and all its major facets are covered. Emphasis on applied OR rather than experimental or theoretical OR is to be expected.

010 British Technology Index. London, England: Library Association, V. 1-, 1961-.

Published monthly with an emphasis on British sources, this journal contains no abstracts. Covering such fields as OR and scientifically oriented management, it is a good source of citations. Emphasis is on applied OR.

015 Business Periodicals Index. New York: H.W. Wilson Co., V. 1-, 1958-, monthly.

Published by one of the benchmarks of American bibliographical work, this subject index serves as an access point to many areas of OR. Depth of coverage in specialized sub-fields is wanting since this index is basically designed for the generalist.

020 Computer Abstracts. Technical Information Co., St. Helier, Jersey, British Channel Islands, V.1-, 1956-, monthly.

It deals primarily with use of digital computers, with lesser emphasis on analogue and hybrid varieties. Regular listings are to be found under operational research, boolean algebra, linear programming, network models, statistics.

025 Computing Reviews. New York: Association for Computing Machinery, V. 1-, 1960-, monthly.

Aiming to furnish computer oriented specialists with critical information about current publications in computer sciences, it contains sections on application, mathematics of computation, hardware, software as well as subsections on simulation and modeling as well as OR.

030 Dissertation Abstracts International. Ann Arbor, Michigan: University Microfilms, V.1-, 1938-, monthly.

Beginning with volume 27 (1961) the abstracts were divided into humanities and sciences sections. The latter covers approximately 300 institutions in the U.S. and Canada. This abstract gives access to doctoral dissertations submitted to University Microfilms. It is a relevant source for all facets of OR. Subject access through the KWIC index is problematic since it is prone to non-explicit author constructed titles.

035 Engineering Index. New York: Engineering Index Inc., V.1-, 1884-, monthly.

This abstracting journal covers all areas relating to engineering with a world-wide scope. Organization and access is excellent with some 12,000 subject headings. It lists hundreds of cross references for OR covering all facets. This is unquestionably a valuable source of OR material especially in the experimental and applied fields.

040 Index of Mathematical Tables, A. Fletcher, J.C.P. Miller and C.B.E. Rosenhead. Reading, Massachusetts: Addison-Wesley, 1962.

This is an index to other works in the field of mathematics which contain tables of data, i.e. prime numbers, factor tables, probability, binomial coefficients. It also gives availability of machine readable data. Limited in value by its publication date.

045 Interdok, Directory of Published Proceedings: Series SEMT, Science, Engineering, Medicine, Technology. Harrison, New York: Interdok Corporation, 1965-.

A good source of information issued by associations or societies which may not have been widely distributed. Many relevant entries to OR, plus helpful cross references.

050 International Abstracts in Operations Research. Baltimore: Operations Research Society of America, V.1-, 1961-, bimonthly.

This tool is organized into five sections: digest, abstracts and reviews, abbreviations, authors, and subject index. Abstracts have been divided into small subject sectors which allow rapid access to specific fields of interest. This is the first index or abstract to search if one is extremely limited in research time. It contains sources of current bibliographies.

055 Management Information Systems Index. Detroit: American Data Processing, V.1-, 1962-.

060 Mathematical Reviews. Ann Arbor, Michigan: University of Michigan, V.1-, 1940-, monthly.

Encompassing all phases of mathematics, from history and biography to optics and geophysics, it is world-wide in its scope. Many sections relevant to OR such as systems control, matrix theory, probability, statistics, and a specific section on OR appear, making this an important source.

065 U.S. Government Reports Index. Springfield, Virginia: U.S. Department of Commerce, National Technical Information Service, V.1-, 1946-, semi-monthly.

GRI indexes the Government Research and Development Reports see following citation: 070.

070 U.S. Government Research and Development Reports. Springfield, Virginia: U.S. Department of Commerce, National Technical Information Service, V.1-, 1946-, semi-monthly.

This source covers U.S. government and government contracted work. It is divided into 22 subject fields over half of which contain material relevant to OR. Sections covering mathematical sciences (12), electronics and electrical engineering (9) and military sciences (15) are particularly rich in information.

075 Operations Research/Management Science. Whippany, New Jersey: Executive Science Institute, V.1-, 1961-, monthly.

Reviewing all aspects of OR, it is aimed at executive non-specialists, in other words, the abstracts cover material which is not extremely technical. Construction of this abstract allows the subscriber to maintain a card file system of these abstracts.

080 Quality Control and Applied Statistics Abstracts Service. New York: Interscience, V.1-, 1956-, monthly.

085 Science Abstracts: Section B: Electrical and Electronics Abstracts. London: Institute of Electrical Engineers, V.1-, 1898-, monthly.

Well indexed abstracting journal covering all aspects of OR including Markov processes, stochastic systems, linear programming, Monte Carlo methods, queueing theory, probability, game theory, etc., not to be overlooked.

090 Science Abstracts: Section C: Computer and Control Abstracts. London: Institute of Electrical Engineers, V.1-, 1966-, monthly.

Citations concerning OR in this abstract obviously emphasize automated aspects. This abstract together with Science Abstracts Section B (085) should be searched together since there is overlap between the two.

095 Selected Rand Abstracts. Santa Monica, California: Rand Corporation, V.1-, 1963-, quarterly.

This is an abstracting publication of Rand's non-classified studies. Occasionally they do studies which concern OR or allied fields such as policymaking, mathematical programming, planning, statistics, etc. This is not a major source, but it is worth reviewing if one is engaged in depth research.

100 Statistical Theory and Method Abstracts. Edinburgh, England: International Statistical Institute, V.1-, 1960-, quarterly.

The goal of this work is the complete coverage of all contributions to theory and method of mathematical statistics and related topics. World-wide coverage is attempted. This abstracting journal is an excellant source for the theoretical research being done in OR. Statistics being a major tool of OR, this is a valuable resource.

105 Scientific and Technical Aerospace Reports. U.S. National Aeronautics and Space Administration. Washington, D.C.: U.S. Government Printing Office, V.1-1962-, semi-monthly.

This abstracting service has a data base of over one million documents with a substancial amount of coverage related to OR. Operations research articles tend to be concentrated in the applied field rather then experimental or theoretical.

110 World Meetings: Social and Behavioral Sciences, Education, and Management: A Two Year Registry of Future Meetings. Chestnut Hill, Massachusetts: World Meetings Information Center Inc., V.1-, 1971-.

The title is self-explanatory. It also lists parameters for papers being accepted for these meetings, persons to contact for information. OR meetings are listed under the sub-heading mathematics.

BIBLIOGRAPHIES

Bibliographies are compilations of works, whatever their form may be, such as books, reports, proceedings, within a well defined subject field and generally arranged alphabetically by author. Bibliographies often are restricted in some manner such as date of publication, language, etc.

Even in this relatively young field of OR, one finds a proliferation of bibliographies. This is therefore not to be considered a bibliography of bibliographies, but instead, an overview of some of the classic works, as well as examples of some current bibliographies in OR subfields.

A final item to keep in mind when using a bibliography is its date of publication. These compendiums are seldon up-dated, a fact which makes them essentially retrospective research tools.

115 Applications of Linear Programming to Urban Planning, James F. McLaughlin. Monticello, Illinois: Council of Planning Librarians, 1968.

Linear programming, a mathematical technique which deals with complex problems involving allocation of scarce resources, is the topic of this short unannotated bibliography.

120 Bulletin Signaletique 110: Informatique Automatique, Recherche Operationnelle. Paris: Centre de Documentation, V.22-, 1961-, monthly.

This is a bibliography of the holdings of the Centre de Documentation in Paris. A continuation of Mathematiques Pures et Appliquees, this is a valuable source. It contains sections on statistics and probability, OR. Very short annotations are given in French. All documents in this bibliography are on file at the Centre.

125 A Comprehensive Bibliography on Operations Research. Case Institute. Wiley, New York: Operations Research Group, 1958-1963.

A two volume retrospective bibliography attempting to cover all OR material prior to 1958.

130 Health Planning Applications of Operations Research and Systems Analysis, A Selected Bibliography, Thomas M. Dunaye, Bobbie L. Foote and Sue L. Dunaye. Monticello, Illinois: Council of Planning Librarians, 1971.

It lists in separate sections monographs, reports, technical documents, journal articles, and bibliographies. All material concerns the tools and techniques of OR as related to planning community health services. Not highly technical, this work is designed for health planners and administrators.

050 International Abstracts in Operations Research.

This work has been discussed above, but it bears repeating since it is an excellent source of current bibliographies.

135 Linear Programming and Associated Techniques: a Comprehensive Bibliography on Linear, Non-linear and Dynamic Programming, V Riley and S.I. Garris. Chevy Chase, Maryland: Johns Hopkins University, 1958.

A dated but useful source for a retrospective search.

140 Network Analysis: A Selected Bibliography, Budd H. Hebert and Elaine Murphy. Monticello, Illinois: Council of Planning Librarians, 1970.

Network structure, network flows, random graphs, design and routing are the principle divisions of this unannotated bibliography. Emphasis is on current literature covering books, proceedings, papers and articles.

145 Operations Research: an Annotated Bibliography, James H. Batchelor. St. Louis: St. Louis Academy Press, 1959-1964.

A four volume work, it covers materials on OR up to 1961. Good annotations, world-wide scope, this bibliography is one of the most important retrospective OR search tools since it covers the time prior to the commencement of the International Abstracts in Operations Research.

150 PERT and CPM: a Selected Bibliography, Maribeth Brennan. Monticello, Illinois: Council of Planning Librarians, 1968.

A non-annotated bibliography on Program Evaluation Review Technique (PERT) and Critical Path Method (CPM).

155 Stochastic Programming: a Selected Bibliography, Bud H. Hebert.. Monticello, Illinois: Council of Planning Librarians, 1970.

Stochastic programming, another tool of OR, is given detailed annotated treatment in this bibliography. Concentration is on methodology.

160 Subject Guide to Books of the Operations Research Center, Cairo. Malhad al-Takhtit al Qawmi. Cairo: Operations Research, 1963.

Title is self-explanatory.

165 Systems Analysis: a Bibliography of Selected Rand Publication. Santa Monica, California: Rand Corporation, 1967.

Contains several hundred citations of unclassified documents dealing with aspects of systems analysis and OR.

170 World Bibliography of Bibliographies, Theodore Besterman. Geneva: Societas Bibliographica, 1965.

This source is probably only useful in an extensive retrospective search.

DICTIONARIES

Included here are dictionaries which are felt to be most useful to the field of OR. Being an interdisciplanary science, one will find entries for fields related to OR, such as statistics, computer programming, etc.

One may expect to find not only definitions but also etymology, biographical data, acronyms, initialisms, and abbreviations in these works.

175 Computer Programmer's Dictionary and Handbook, Donald Spencer. Waltham, Massachusetts: Blaisdell Publishing Co., 1968.

Contains approximately 1200 entries, with an emphasis on programming. Many tables, some biography, lists of manufacturors are included.

180 A Dictionary of Statistical Terms, Maurice G. Kendall and William R. Buckland. New York: Hafner Publishing Co., 1960.

Prepared under the auspices of the International Statistical Institute and UNESCO, this work fills the gap in time from the publication of Statistical Dictionary (see number 195). Contains foreign language glossaries.

185 Funk and Wagnalls Dictionary of Data Processing, Harold A. Rogers. New York: Funk and Wagnalls, 1970.

It attempts coverage of hardware, software, programming, logic, etc.

190 Mathematical Dictionary-Multilingual Edition. Princeton, New Jersey: Van Nostrand, 1968.

It gives the English language user access to mathematical terminology in French, German, Russian, and Spanish.

195 Statistical Dictionary, Albert Kurtz and Harold A. Edgerton. New York: Hafner Publishing Co., 1967.

A reprint of the 1939 edition, its purpose is to provide the user with clear, concise definitions of statistical terms. Covers mathematical, educational, psychological, business, and biological statistics. Somewhat dated for OR but it is still useful.

DIRECTORIES

From directories one may expect to be able to locate the names of individuals or organizations and their respective addresses. No directory specifically for OR was located, however, since by nature OR involves the disciplines of mathematics and statistics, several of their directories have been included.

200 Directory of Statisticians and Others in Allied Professions. Washington, D.C.: American Statistical Association, 1961-, annual.

It contains the combined membership of the American Statistical Association, Biometric Society, and the Institute of Mathematical Statistics.

205 Who is Related to Whom in the Computer Industry. Computer Consultants. Oxford: Pergamon Press, 1969.

Being a directory of companies rather than persons, it is divided into three sections each giving access to the computer industry members.

210 World Directory of Mathematicians. International Mathematical Union. Stockholm: Almquist and Wiksell, 1969.

Title is self-explanatory.

PRIMARY SOURCES

Principally in the form of journals, the primary source is the main mode of currency for any field including OR. No attempt at completeness has been made since it would involve the inclusion of hundreds of titles. Only an overview of the hallmark sources has been presented.

215 CORS Journal. Ottawa: Canadian Operational Research Society, V.1-, 1963-.

Published three times per year, this journal is useful in obtaining OR research being conducted in Canada. Abstracts of articles are in English and French. Both applied and theoretical aspects of OR are treated.

220 Journal of the Operations Research Society of Japan. Tokyo: Operations Research Society of Japan, V.1-, 1958-.

In English, it is oriented to Japanese research in OR.

225 Naval Research Logistics Quarterly. Washington, D.C.: U.S. Department of the Navy, Office of Naval Research, V.1-, 1954-, quarterly.

The U.S. Navy being one of the early development forces in the field of OR, this journal will continue to be a rich source of articles on mathematics, statistics, economics, nearly all of which have an emphasis on OR.

230 New Journal of Statistic and Operational Research. Bradford, England: Institute of Technology, V.1-, 1966-.

Especially strong for current research conducted in the United Kingdom, this journal is published three times per year.

235 Operations Research. Baltimore, Maryland: Operations Research Society of America, V.1-, 1952-, 6/year.

Being one of the most important courses of current OR information in the U.S., articles cover all facets of this science. Abstracts are included and there is a book review section.

240 Opsearch: Journal of the Operational Research Society of India. New Delhi: Operational Research Society of India, V.1-, 1964-, quarterly.

Oriented to the Indian milieu.

245 Progress in Operations Research. Wiley, New York: Operations Research Society of America, V.1-, 1961-.

This irregular series sponsored by the Operations Research Society of America gives a state of the art view of OR. Starting with volume three, a topical approach was adopted. It is well documented.

INTRODUCTION AND GUIDES

Perhaps because of the relative youth of the OR field, one will encounter a high frequency of introductory monographs on the subject. Many of these introductions are in textbook form. The effort here has been to include those works which are considered standards of the field, sources which act in the tradition of a desk reference guide. While being comprehensive in scope, these volumes tend to be shallow in depth. Some introductions or guides for such sub-fields as queueing theory have been included.

250 Basic Operational Research, P.G. Moore. London: Sir Isaac Pitman and Sons, 1968.

An elementary textbook oriented to the more serious student.

255 Dynamic Programming, D.J. White. San Francisco: Holden-Day, 1969.

Covering adaptive, stochastic and deterministic processing, this work may also be considered as an introduction to subfields in OR. The author is a professor of OR in Glasgow.

260 Executive Decisions and Operations Research, D.W. Miller and M.K. Starr. Englewood Cliffs, New Jersey: Prentice-Hall, 1969.

Examining the structure of decision problems from an integrated decision theory viewpoint, this is an elementary level work. It contains a good introductory level bibliography.

265 Guide to Operational Research, Walter Eric Duckworth. London: Methuen, 1965.

270 How to Find Out in Mathematics, John E. Pemberton. New York:

covers such topics as mathematical education, history and biography, sources of Russian mathematical information, etc. There is a special section on probability and statistics, as well as OR.

275 Implementation of Operations Research, Jan H.B.M. Huysmans. New York: Interscience, 1970.

An elementary handbook for application of OR to problems in business and industry. It covers objective setting, research, experiment design, analysis of results, etc.

280 Integer Programming and Network Flows, T.C. Hu. Menlo Park, California: Addison-Wesley, 1969.

This is an advanced textbook in OR containing extensive references and bibliographical material, exercises, tables.

285 Introduction to Operations Research, Patrick Rivett. San Francisco: Basic Books, 1968.

Not a work for the OR specialist, but it is a good starting point for one interested in this field. Short, uncomplicated and with an adequate bibliography.

290 Manager's Guide to Operations Research, Russell L. Ackoff. New York: Wiley, 1963.

It covers management cybernetics, quantitative management and statistical management.

295 Network Analysis for Planning and Scheduling, Albert Battersby. Englewood Cliffs, New Jersey: Prentice-Hall, 1969.

Another introduction to a subfield of OR, it covers CRT, PERT, heuristic methods, etc. It gives sets of problems for solution and a bibliography.

300 Queuing Theory, Joseph A. Panico. Englewood Cliffs, New Jersey: Prentice-Hall, 1969.

Being designed as a supplementary textbook, it serves as an introduction to a major facet of OR. It contains ample graphs, formulas, and examples.

305 Structure of Human Decisions, David W. Miller and Martin K. Starr. Englewood Cliffs, New Jersey: Prentice-Hall, 1967.

Limited in its use of mathematics and statistics, it

310 User's Guide to Linear Programming, Hans G. Daellenbach and Earl J. Bell. Englewood Cliffs, New Jersey: Prentice-Hall, 1970.

The purpose of this work is to enable prospective users of linear programming to recognize decision problems that may apply to this method and prepare computer programs. It assumes a prior knowledge of the field.

HANDBOOKS

Citations included in this catagory tend to be for practical works for the OR specialist. Heavy use of tables, graphs, formulas and symbols may be expected. Handbooks tend to be reference materials, the types of books that would be found in the private collection of operations research personnel.

315 Computer Handbook, Harry Huskey and Granino A. Korn. New York: McGraw Hill, 1962.

A somewhat dated but still useful one volume source of general principles of both design and utilization of computers. The work stresses technique and not theory.

320 CPST/Computer Programs in Science and Technology. New York: Science Associates, V.1-, 1971-, quarterly.

This journal gives access to computer program sources which may be used for problem solution. It contains a roster of vendors, and a bibliography of articles in which programs have been described. Contains numerous entries for OR and related sub-fields.

325 Design and Use of Computer Simulation Models, James R. Emshoff. New York: Macmillan, 1970.

330 Handbook of Automation, Computation and Control, Eugene Munter Grabbe. New York: Wiley, 1958-1961.

with systems analysis, it contains many sections relat

335 Handbook of Numerical Methods and Application, Louis G. Kelly. Menlo Park, California: Addison-Wesley, 1967.

Its emphasis is on numerical methods and the computer; there is a separate section on statistics and ample references plus a bibliography.

340 Handbook of Probability and Statistics with Tables, Richard S. Burington and Donald C. May. New York: McGraw-Hill, 1970.

It aims to be a convenient summary of theory, working rules and tabular material useful in practical application of statistics and probability. It is well indexed.

345 Handbook of Selected Sample Surveys, Jean Namis. New York: St. Johns University Press, 1969.

It is an excellent source of information of the federal statistical gathering system. Adequately describes sources by agency of publication. Each section contains a bibliography.

350 Handbook of Tables for Mathematics, Samuel M. Selby. Cleveland, Ohio: Chemical Rubber Co., 1970.

An extensive work that should be on the book shelf of anyone in the OR field, it contains over a hundred pages on probability and statistics alone.

355 Handbook of Tables for Probability and Statistics, William H. Beyer. Cleveland, Ohio: Chemcial Rubber Co., 1968.

Covering probability-distribution, chi-square, order statistics, quality control, non-parmetric statistics, it is a source not to be missed.

360 Handbook of the Poisson Distribution, Frank A. Haight. New York: Wiley, 1967.

365 Powers, Roots, Reciprocals From .0001-1.000, Hans Hol. Jenkintown, Pennsylvania.

It is a good source if you have no access to a computer.

370 Tables of Integrals and Other Mathematical Data, Herbert B. Dwight. New York: Macmillan, 1961.

Algebraic functions, probability integrals, hyperbolic functions, etc., are covered.

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